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PATENT SPECIFICATION

714,619



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COMPLETE SPECIFICATION.

Improvements in or relating to Two-Stroke Single Cylinder Internal Combustion Engines.

I, WILLIAM THOMAS TEAGLE, a British Subject, of Blackwater, Truro, Cornwall, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement :—

This invention relates to two-stroke single-cylinder internal combustion engines of the kind wherein the crankshaft bearings are disposed on one side of the axis of the cylinder. The invention relates more particularly to engines of this kind which are used for driving small machines and appliances and also for model engineering.

The object of the present invention is to provide an improved construction of engine which not only simplifies manufacture but in which assembly and dismantling can be very easily carried out thus reducing both manufacturing and servicing costs.

According to the invention there is provided for use in a two-stroke single-cylinder internal combustion engine of the kind described a unit comprising a cylinder, crankcase, and crankshaft-bearing housings all of which are cast integrally, the vertical wall of the cylinder being provided with a pair of diametrically opposed ports of which at least one is of a diameter sufficient to enable the gudgeon pin to be passed therethrough so that the piston and connecting rod can be assembled within the cylinder, and at least one of which ports constitutes an inlet port adapted to be controlled by the piston, whilst the other is adapted either to be used as an additional inlet port or to be blanked off after the piston and connecting rod have been assembled.

Reference will now be made to the accompanying drawings which illustrate a preferred construction according to the invention, and in which :—

Figs. 1 and 2 are perspective views of an integrally cast unit according to the invention comprising a cylinder, crankcase, and crankshaft bearing housings ;

Fig. 3 is a plan view of a single-cylinder, two-stroke, internal combustion engine incorporating the unit shown in Figs. 1 and 2 ;

Fig. 4 is a sectional elevation taken on the line IV—IV of Fig. 3.

In the construction illustrated the integrally cast unit for a single-cylinder, two-stroke, internal combustion engine comprises a cylinder barrel 1 formed with the usual cooling fins 2 around its upper portion, a substantially cylindrical, open-ended crankcase 3 formed at the lower end of the barrel, and two co-axially aligned crankshaft bearing housings 4 and 5 formed respectively at one end of the crankcase and at the outer extremity of a rigid arm 6 which projects from the same end of the crankcase and to one side thereof. The arm 6 preferably comprises a web or plate portion 7 of arched or curved cross-section extending substantially parallel to the axis of the housings 4 and 5 and formed with outwardly projecting flanges 8 along its upper and lower edges to provide a rigid, robust structure, but any other girder or box form of beam may be used. A pair of apertured lugs 9 are formed on the arm 6 adjacent the inner and outer extremities thereof to provide means for mounting the engine on a suitable support.

Immediately below the cooling fins the cylinder barrel is formed with a pair of diametrically opposed inlet ports 10 of a diameter sufficient to enable the gudgeon pin to be passed through them easily.

[Price : 2s. 8d.]

those portions of the outer surface of the barrel which surround said ports being raised and having flat, machined faces for the application of an induction manifold or a carburettor. Disposed at 90° to the inlet ports and slightly higher in the cylinder is an exhaust port 11, whilst opposite the exhaust port the barrel is provided with a transfer passage 12 in the form of a groove formed vertically in the inner surface of the cylinder and leading to the crankcase.

In Figs. 3 and 4 there is shown a single-cylinder, two stroke, internal combustion engine incorporating the integrally cast unit described above and illustrated in Figs. 1 and 2. In addition to this unit the engine includes a detachable cylinder head 13 which is fixed to the upper end of the cylinder barrel by bolts 14, and which is adapted to receive the sparking plug 15, a detachable cylinder liner 16, a carburettor 17 connected to one or both of the inlet ports as required, and a piston 18 connected by a gudgeon pin 19 and connecting rod 20 to the crankpin 21a of the crankshaft 21 which is supported by ball-bearings 22 and 23 mounted in the housings 4 and 5 respectively. The bearing 22 is secured firmly within the housing 4 by means of a number of gib bolts 22a. In order to ensure adequate lubrication of the big end of the connecting rod 20, the crankpin 21a is provided with a longitudinal passage 21b intersected by a transverse passage 21c which extends right through the crankpin and of which one end is of reduced diameter as indicated at 21d. This reduction in diameter is made in order to avoid decreasing too much that part of the crankpin's surface which takes the pressure when the piston is at the top of its stroke, i.e. when the pressure is most intense. Circulation of the petrol oil mixture through these passages is maintained by the centrifugal force which results from the rotation of the crank. Oil seals 24 are also provided in the bearing housings, and the end of the crankcase remote from said housings can conveniently be closed by a detachable cover-plate 25. The latter is made detachable in order to permit the connection of the connecting rod to the crankpin during assembly of the engine. Intermediate the bearing housings a pulley 26, gear wheel, or the like is keyed or otherwise fixed to the crankshaft to enable a drive to be taken therefrom. The crankshaft is also extended beyond the outer bearing housing 5 for the purpose of driving a magneto 27 by which the sparking plug is energised, the rotor of the magneto being keyed to said extension of the crankshaft for rotation therewith and the stator being bolted or otherwise fixed to the housing 3. In order to assist the cooling of the cylinder barrel a fan 28 is secured

to the crankshaft or to some part rotating therewith, such as, for example, the rotor of the magneto, the flow of air produced by the fan being directed over the cooling fins by means of an open duct 29 which can conveniently be secured at one end to the cylinder head by means of the cylinder head bolts 14 and at the other end of the outer bearing housing 5 by bolts 30. For starting the engine a pulley 31 is provided, said pulley being fixed to the end of the crankshaft externally of the duct 29. A silencer 32 is conveniently attached to the exhaust port 11.

To assemble the engine the crankshaft, together with the bearings and the oil seals, is first mounted in the housing structure. The connecting rod is next inserted into the cylinder from the lower end thereof and is mounted on the crank pin on the end of the crankshaft. The piston, together with its attached rings, is then inserted from the top of the cylinder and the gudgeon pin bearing aligned with the inlet ports: the upper end bearing on the connecting rod is also brought into alignment and the gudgeon pin then inserted through one of the inlet ports to connect together the piston and connecting rod. The other inlet port serves for the insertion of an extractor pin when dismantling.

If only one of the inlet ports is being used the opposite port can conveniently be blanked off by a detachable plate 33.

It will be seen therefore that the improved construction reduces the number of machined surfaces, with a corresponding reduction in the use of gaskets, whilst at the same time all parts are easily accessible for inspection or servicing.

What I claim is:—

1. For use in a two-stroke single-cylinder internal combustion engine of the kind described a unit comprising a cylinder, crankcase, and crankshaft-bearing housings all of which are cast integrally, the vertical wall of the cylinder being provided with a pair of diametrically opposed ports of which at least one is of a diameter sufficient to enable the gudgeon pin to be passed there-through so that the piston and connecting rod can be assembled within the cylinder, and at least one of which ports constitutes an inlet port adapted to be controlled by the piston, whilst the other is adapted either to be used as an additional inlet port or to be blanked off after the piston and connecting rod have been assembled.

2. A unit according to Claim 1, wherein said crankcase is of substantially cylindrical, open-ended form, and wherein said crankshaft bearing housings are formed in co-axial alignment one at one end of the crankcase and another at the outer extremity of a rigid arm which projects from the same

- end of the crankcase and to one side thereof.
3. A unit according to Claim 2, wherein said arm consists of a web or plate portion of arched cross-section extending substantially parallel to the axis of the bearing housings and formed with outwardly projecting flanges along its upper and lower edges.
4. A unit according to any of the preceding claims, wherein the cylinder is formed with cooling fins around its upper portion, and wherein the diametrically opposed ports are formed immediately below said fins, the portions of the outer surface of the cylinder which surround said ports being raised and having flat, machined faces for the application of an induction manifold or a carburettor.
5. A unit according to any of the preceding claims, including an exhaust port formed in the wall of the cylinder at an angle to and higher than said diametrically opposed ports, and a transfer passage in the form of a groove formed vertically in the inner surface of the cylinder and leading to the crankcase.
6. A single-cylinder internal combustion engine including a unit as claimed in any of the preceding claims.
7. A single-cylinder internal combustion engine including a unit as claimed in any of Claims 2 to 5, a detachable cylinder head adapted to receive a sparking plug, and a magneto adapted to be driven by said crankshaft for energising the sparking plug.
8. A single-cylinder internal combustion engine according to Claim 7, wherein the crankshaft is extended beyond the outer bearing housing to carry the rotor of the magneto the stator of which is securely fixed to said outer housing, and wherein a pulley or the like is fixed to the crankshaft immediate the bearing housings to enable a drive to be taken from the crankshaft.
9. A single-cylinder internal combustion engine according to Claims 7 or 8, wherein a fan is provided to assist the cooling of said cylinder, said fan being adapted to be driven by the crankshaft or some part rotating therewith, and the flow of air produced by said fan being directed over the cooling fins on the cylinder by an open duct secured at one end to the cylinder head and at the other end to the outer bearing housing.
10. A single-cylinder internal combustion engine according to Claims 7, 8 or 9, wherein the end of the crankcase remote from said housings is adapted to be closed by a cover-plate which is detachable to permit the connection of the connecting rod to the crankpin of the crankshaft during assembly of the engine.
11. For use in a single-cylinder internal combustion engine a unit constructed and arranged as herein described with reference to Figs. 1 and 2 of the accompanying drawings.
12. A single-cylinder internal combustion engine constructed, arranged and adapted to operate as herein described with reference to the accompanying drawings.
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Bridge Street,
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London, E.C.4.

PROVISIONAL SPECIFICATION.

Improvements in or relating to Two-Stroke Single Cylinder Internal Combustion Engines.

- I, WILLIAM THOMAS TEAGLE, a British Subject, of Blackwater, Truro, Cornwall, do hereby declare this invention to be described in the following statement:—
- This invention relates to internal combustion engines and more particularly to two-stroke, single cylinder engines as used for driving small machines and appliances and also for model engineering.
- The object of the present invention is to provide an improved construction of engine which not only simplifies manufacture but in which assembly and dismantling can be very easily carried out thus reducing both manufacturing and servicing costs.
- According to the invention the cylinder, the crankcase and the crankshaft bearing housings are cast integrally, the cylinder being provided with a pair of diametrically opposed ports of which at least one constitutes an inlet port and is of a diameter to pass the gudgeon pin so that the piston and connecting rod may be assembled within the cylinder.
- The improved engine has been designed particularly but not exclusively for operating a power driven hedge cutter and a preferred embodiment of the invention for this purpose will now be described. The cylinder barrel, which is adapted to be provided at its upper end with a detachable cylinder head and to be fitted with a detachable liner if desired, is formed with the usual air cooling fins around its upper portion and at its lower end is formed integral with a substantial cylindrical crankcase. One side

of the crankcase is closed by a detachable cover plate whilst at the other side the crankcase is formed to provide a housing for one of the crankshaft bearings. Extending from that side of the crankcase embodying the bearing housing is a rigid arm on the extremity of which is formed a second crankshaft bearing housing, the said arm, the two bearing housings, the crankcase and the cylinder barrel being cast as one integral unit. Preferably, the arm supporting the outer crankshaft bearing comprises an axially extending web or plate portion of curved cross section with outwardly projecting flanges along its edges to provide a rigid robust structure, but any other girder or box form of beam may be used. Suitable lugs may also be cast on the said arm and on the outermost bearing housing for mounting the engine on a suitable support.

The cylinder barrel is formed intermediate its ends with a pair of diametrically opposed inlet ports of a diameter sufficient to pass the gudgeon pin easily, the outer face of the barrel being machined at these points for the application of an induction manifold or of a carburettor. Disposed at 90° to the inlet ports and slightly higher in the cylinder is an exhaust port whilst opposite the exhaust port the barrel is formed with a vertically disposed transfer passage leading to the crankcase, the engine operating on the normal two-stroke cycle.

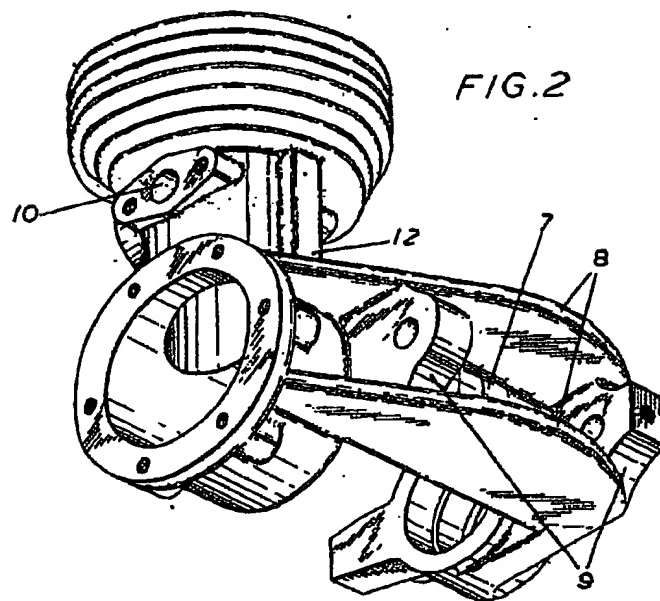
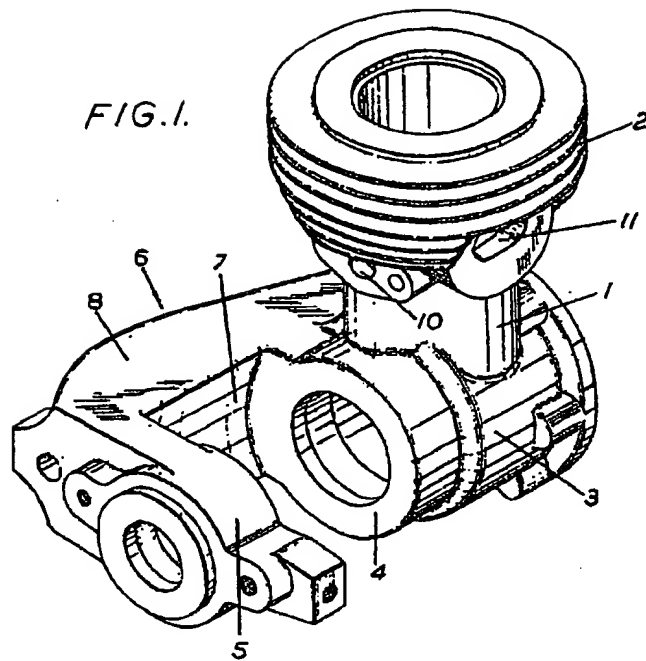
To assemble the engine, the crankshaft

with bearings and suitable oil seals is first mounted in the housing structure, the crankshaft being provided at a point between the bearing housings with a gear wheel or equivalent means for taking a drive from the engine. The connecting rod is next inserted into the cylinder from the lower end thereof and is mounted on the crank pin on the end of the crankshaft. The piston with attached rings is then inserted from the top of the cylinder and the gudgeon pin bearing aligned with the inlet ports, the upper end bearing on the connecting rod is brought into alignment and a gudgeon pin then inserted through an inlet port to connect together the piston and connecting rod. The other inlet port serves for the insertion of an extractor pin when dismantling.

If desired, only one inlet port may be used, the opposite port being blanked off when not required by a detachable plate.

It will be seen therefore that the improved construction reduces the number of machined surfaces, with a corresponding reduction in the use of gaskets, whilst at the same time all parts are easily accessible for inspection or servicing.

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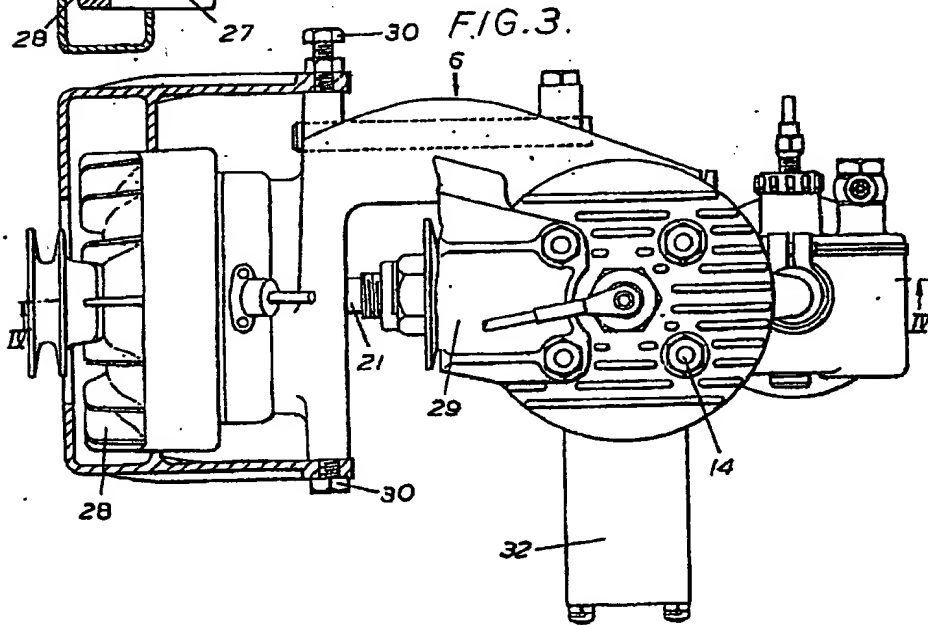
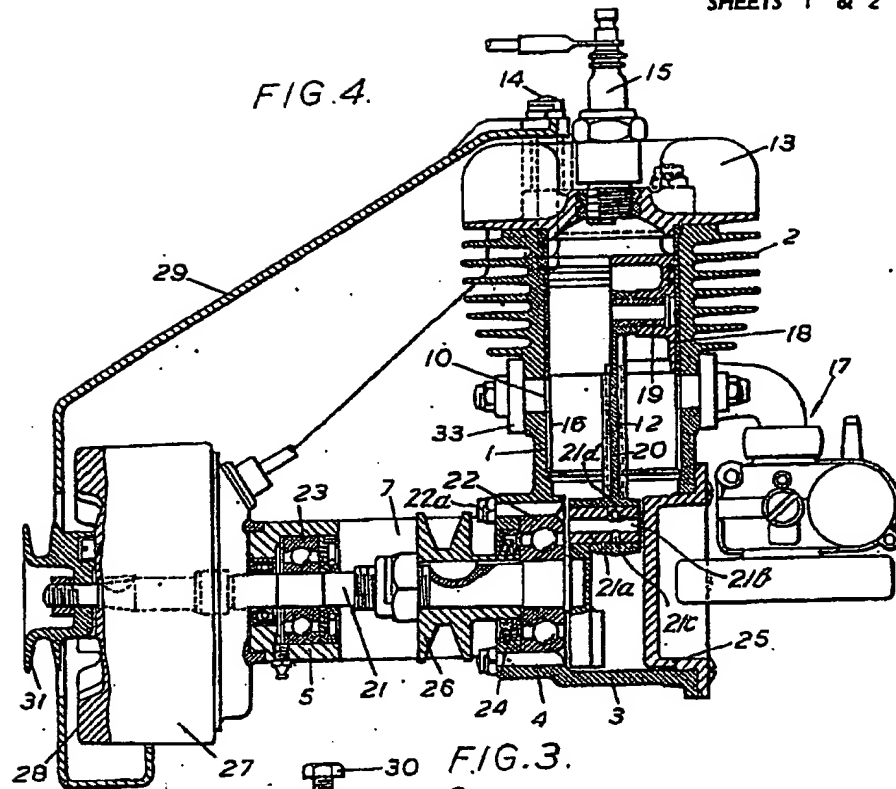


714,619 COMPLETE SPECIFICATION

2 SHEETS

This drawing is a reproduction of
the Original on a reduced scale.

SHEETS 1 & 2



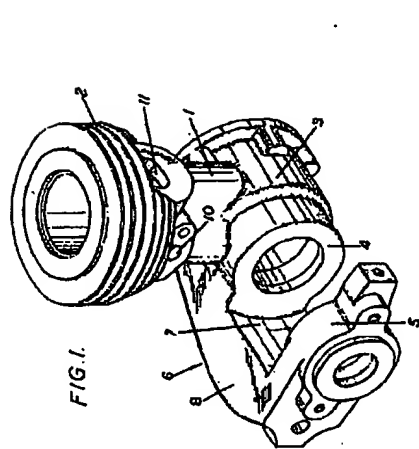


FIG. 1.

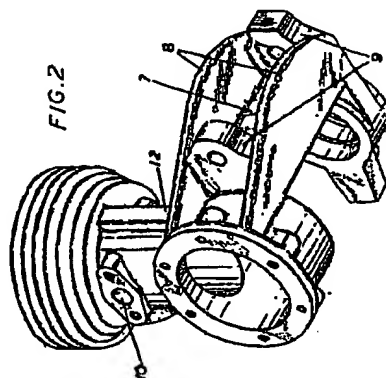


FIG. 2.

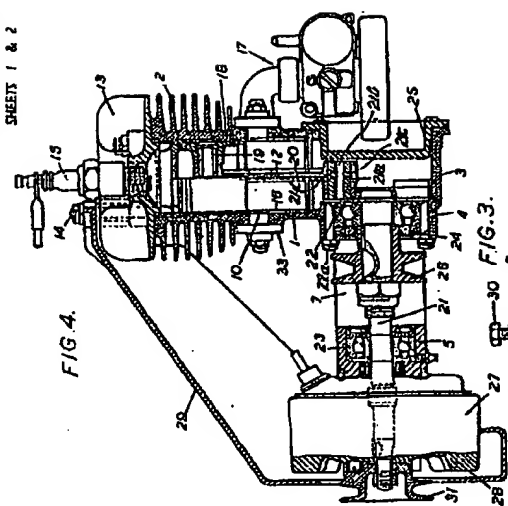


FIG. 3.

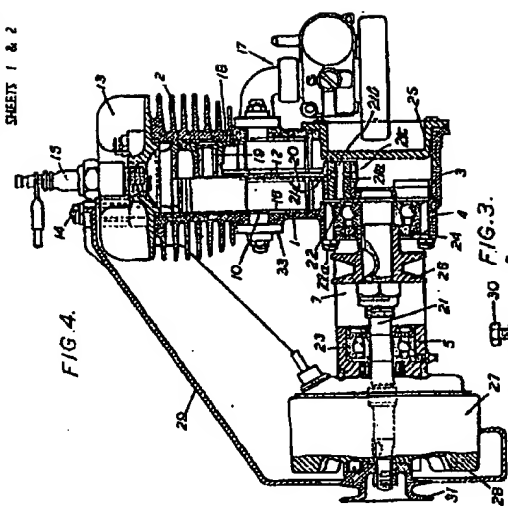


FIG. 4.